types of tissue cells will appear in later papers. Similar experiments were tried with the tissues of crayfishes and crabs with little result beyond keeping these cells alive for several weeks. The blood corpuscles of the crayfish were kept alive and active for three months.

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NOTE ON THE ABSORPTION OF CALCIUM DURING THE MOLTING OF THE BLUE CRAB, CALLINECTES SAPIDUS

THE problem of molting in crabs has thus far been investigated, with one exception,[1] only from the morphological point of view.[2] The following observations bear on certain chemical phases of the process of hardening following normal molting in the common blue crab.

The crab hardens by the deposition of $CaCO_3$ within the tissues of the soft shell. Has this Ca been absorbed and held in reserve during the period of preparation for molting,[3] or is it absorbed from the sea-water during the actual period of hardening? To test this matter, the following procedure was employed. Three pairs of crabs were chosen, each pair consisting of a recently shed individual and of a hard-shell individual of nearly the same size.[4] A comparison of the Ca content of the individuals of the same pair should throw light on the alternatives suggested. If the Ca content of the two members of each pair is equal, then the Ca must be absorbed before molting and held in reserve. If the Ca content of the hard specimen is very much larger than that of the soft, then the Ca must be absorbed after molting. Furthermore, if the first alternative is the true one, the Ca content of a crab in the act of casting its shell should be much greater than that of a normal hard crab. If, however, they have the same Ca content, then the second alternative is indicated.

Each crab was ashed separately, and the Ca in the ash determined by precipitating it as the oxalate, igniting and weighing as the oxide. The results of the analyses are indicated in the table. In each pair the hard-shell specimen contains about twenty times the amount of Ca contained in the soft one. Also, Crab No. 9, which was in the act of casting its shell, has a Ca content comparable to that of a normal hard individual.

This shows clearly that the Ca used by the soft-shell crab for the purpose of hardening its new shell is not present at the time of the molt, but is absorbed from the sea-water during the hardening.

The mechanism by means of which a molting crab is enabled to absorb such abnormally large quantities of Ca is at present obscure, and in view of the meager data at hand, a discussion of this problem is best postponed until more work shall have been done.

TABLE

Crab No.	Condition	Width, Cm.	Weight, Gm.	Weight, Ca, Gm.	Ca Content, Per Cent.
6	soft	8.3	37.20	0.0720	0.19
11	hard	8.3	34.54	1.845	5.34
3	soft	9.7	56.53	0.1468	0.26
7	hard	9.5	61.62	2.963	4.81
13	soft	10.5	70.00	0.2197	0.31
12	hard	11.0	70.90	3.617	5.17
8	hard	8.7	54.75	2.861	5.22
9	molting	8.5[5]	67.93	2.520	3.72

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[1] Irvine and Woodhead, *Proc. Roy. Soc. Edinb.*, Vol. 16, pp. 324–354, 1888–89.

[2] For a review of the literature on the natural history of molting in Crustacea, see Herrick, Bull. U. S. Bureau of Fisheries, Vol. XV., pp. 1–252, 1895. For this species of crab, see Hay, App. Rep. U. S. Comm. Fish., pp. 395–413, 1904.

[3] *Cf.* Smith, *Quart. Journ. Microsc. Sci.*, Vol. 59, p. 272, 1913.

[4] These were collected at the Beaufort, N. C., station of the U. S. Bureau of Fisheries. The writer is indebted to Dr. H. M. Smith, the commissioner, for the privilege of staying at the station.

[5] The width of the new shell was 9.8 cm. The *per cent.* of Ca in this specimen is low because the molting crab weighed more than an ordinary 8.5 cm. crab, and also because the old shell had two legs missing, which were being regenerated. The *actual* weight of Ca, however, is very close to that of a normal hard crab.